

# NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE SPECIFICATION

## BRUSH MANAGEMENT

(ACRE)  
CODE 314

### I. SCOPE

The work shall consist of furnishing material and equipment as required to control brush at levels that meet management objectives.

### II. GENERAL SPECIFICATIONS

For areas of native rangeland, brush management generally will not be considered for any woody species unless the percent composition (either by weight or canopy cover) of the target species within the present plant community significantly exceeds that listed as potential on the associated site description (approximately double the *average* percent composition listed in the site description). Brush management for areas of seeded rangeland (i.e. introduced wheatgrasses) will generally not be considered unless the canopy cover of woody species over the seeding is at least 15 percent and control measures have an expected longevity of more than 20 years before re-treatment will be needed.

All areas to be treated will have form SCS-CPA-52 "Environmental Effects for Conservation Plans and Areawide Conservation Plans" completed prior to practice application.

All areas to be mechanically treated will have form NV-EVC-1 "Cultural Resources Worksheet" completed prior to practice application.

Rangeland areas (including seeded range) to be treated will have form NV-ECS-01 (Rev. 4/88) "Rangeland Inventory Worksheet" completed prior to practice application. The header entries on form NV-ECS-01 are to be filled-in and columns 3, 5, 6, and 7 will be completed for commonly occurring species in the pretreatment plant community. Column 4 on form NV-ECS-01 (canopy cover) is also to be completed for *each* tree or shrub species in the pretreatment plant community.

An undisturbed (irregular-shaped) strip of land supporting natural vegetation (approximately 100-feet in width) should be left along each side of perennial streams, native meadows, and other wetland areas.

Include the needs of wildlife species in the overall brush management plan. Species that need consideration include; pronghorn antelope, sage grouse, pygmy rabbit, mule deer and elk. If on-site evaluation identifies possible wildlife conflicts, the NRCS Biologist will be consulted.

Wherever sage grouse "strutting" grounds (leks) are located within the area to be treated, the NRCS Biologist will be contacted to determine the size of the untreated buffer zone to be left around the strutting ground.

Low-volatile esters will be used on any control project where drift of chemical spray is of concern. Need for low-volatile ester formulations will be determined with concurrence of the landowner and the NRCS conservationist assisting in planning the practice prior to the application of the chemical(s).

In accordance with NRCS policy, NRCS personnel are not authorized to provide recommendations for herbicide use. Landowners should contact local Cooperative Extension Service, chemical company representative or an agricultural consultant for specific recommendations. NRCS personnel will evaluate environmental risk associated with herbicide recommendations relative to treatment site conditions.

### III. INSTALLATION

#### MECHANICAL TREATMENT

##### Plowing or Rotary Tiller Equipment

Tillage equipment is only used on sites with relatively stone-free soils and level to moderate slopes with less than a 30 percent gradient.

Moldboard plow, wheatland plow, standard disk plow, heavy offset disk (Towner disk), brushland plow, heavy sweep and root-type plows, and heavy-duty rototiller type equipment can be used.

### III. INSTALLATION (continued)

#### MECHANICAL TREATMENT (continued)

Equipment will be operated at depths and at angles to ensure complete cutting of taproots and lateral roots of target species. Treatment will be sufficient to reduce target species composition capable of reproduction by 90 percent upon completion of operation.

Time of operation is dependent upon the species to be controlled, rainfall patterns, and seeding practices to follow treatment. Brush management operations will be timed to prevent the exposure of bare soil for long periods of time and to reduce erosion and sediment transport into adjacent water bodies.

For big sagebrush control, operations shall be in late spring to mid-summer when soil conditions are favorable for plowing. Soils should be sufficiently dry that partly covered plants will not make re-growth. All operations shall be completed prior to seed maturation of target species. A follow-up treatment may be necessary in late summer or early fall to complete the kill.

Re-vegetation of areas that have been plowed or tilled is required. Spring plowing (*accomplished after most cheatgrass plants have germinated, yet prior to seed formation*) and summer fallow followed by light disking just prior to a late-fall seeding of perennial plants is considered an effective way to rehabilitate cheatgrass range. See RANGE PLANTING (Code 550) or PASTURE AND HAYLAND PLANTING (Code 512) conservation practice standards and specifications.

Treated areas will be deferred from grazing following treatment until seeded plants are well established and the soil is adequately protected with a vegetative cover to prevent erosion. See PRESCRIBED GRAZING (Code 528-A) conservation practice standards and specifications.

#### Railing and Dragging

This method of control is not effective on crown-sprouting shrubs species such as snowberry, rabbitbrush, black greasewood, and silver sagebrush, or any woody plants that sprout from roots when the tops are killed.

Railing and dragging equipment are not to be used on any sprouting shrub species except in areas being treated primarily to improve wildlife habitat.

Use of this method is limited primarily to stands of mature big sagebrush having an adequate understory of native grasses and forbs.

This method of brush management is not recommended if the site is to be seeded following treatment.

Rails or other objects of various types and design that are heavy enough to obtain satisfactory kill of target species may be used. Motor patrols and bulldozers, where blades are used for surface scalping, are also suited.

Time of operation is after brush has become dry and brittle but before brush has matured seed. Timing will vary with seasonal conditions and elevations. Late summer or early fall periods are normally most effective for big sagebrush.

Number of operations will be sufficient to reduce target species composition capable of reproduction by 80 percent upon completion of treatment.

Treated area will be deferred from grazing following treatment until the soil is adequately protected with a vegetative cover to prevent erosion and there is sufficient forage available to meet animal needs. See PRESCRIBED GRAZING (Code 528) conservation practice standards and specifications.

#### Chaining

Chaining is well suited for control of even-aged, mature, stands of non-sprouting, single-stemmed species such as big sagebrush, Utah and western juniper, and singleleaf pinyon.

Chaining operations can be used on land that is too rough, steep, or rocky for other equipment.

Re-vegetation should be considered if there is less than 25 percent composition (by-weight), in total, of desired understory species present in the plant community prior to treatment. See RANGE PLANTING (Code 550) conservation practice standards and specifications.

Chaining is accomplished by dragging an anchor chain in a U-shape, half-circle, or J-shape behind two crawler tractors traveling in a parallel direction. A chain length of 200 to 500-feet with individual links weighing 75 to 150-pounds each is recommended. Heavier links stay on the ground better and are more effective on young trees and shrubs. The chain is attached to each tractor using a swivel joint to allow for tumbling and turning of chain. Chains are drug in a loose pattern to maximize ground contact. A chain length to swath width ratio of 2:1 to 3:1 is most effective. Higher traveling speeds produce more whip action on the chain and result in higher kills.

### III. INSTALLATION (continued)

#### MECHANICAL TREATMENT (continued)

The Ely chain is a modified conventional anchor chain where short lengths of railroad iron are welded across each link. An Ely chain will uproot large shrubs and trees as the welded cross-rail catches the base of a plant. The heavy chain then rolls over the uprooted plants crushing and breaking the branches. An Ely chain also loosens the surface soil and creates an excellent seedbed for broadcast planting. Refer to the publication The Ely Chain (Cain, 1971) for more information on uses, construction, and operation of an Ely chain.

Chaining shall be accomplished on the contour wherever possible. Chaining on the contour reduces power requirements for equipment and soil-disturbance furrows and brush and/or tree windrows are left on the contour. Debris piles oriented across slope interrupt overland flow and act as sediment traps.

Number of operations will be sufficient to reduce target species composition capable of reproduction by 80 percent upon completion of treatment.

Time of operation is after brush has become dry and brittle but before brush has matured seed. Timing will vary with seasonal conditions and elevations. Late summer or early fall periods are normally most effective for big sagebrush. Chaining of juniper and singleleaf pinyon is most effective when soil moisture is still high.

Treated area will be deferred for a period of time to allow for vegetative recovery for soil erosion protection. The period of deferment may be quite variable depending on the amount of soil surface disturbance. See PRESCRIBED GRAZING (Code 528) conservation practice standards and specifications.

#### Cutting

The cutting and disposal of individual plants is adapted to sites supporting a mix of woody species and only certain species are targeted for removal (or retention). This method is also applied to sites where a reduced number of target species is desired, especially trees such as juniper and singleleaf pinyon.

The number, size, quality, and species to be saved should be determined before cutting begins. If appropriate, individual plants (trees) to be saved should be marked to prevent unnecessary delay in selection by cutters.

Chain saws, bow saws, axes or other appropriate hand tools, will be utilized.

Downed trees should be salvaged for fuelwood, sawlogs, poles, posts, or other use. Tree tops and limbs that remain following salvage should be lopped and scattered, or piled and burned, depending on the amount of slash produced. Slash burning will be done in openings.

Stumps will be as cut as low to the ground surface as possible with equipment being used.

#### Beating and Mowing

Beating or mowing equipment is not to be used on any sprouting shrub species except in areas being treated primarily to rejuvenate browse plants for improved wildlife habitat.

This method is well suited to areas supporting stands of mature big sagebrush (and other non-sprouting shrub species) having an adequate understory of desirable herbaceous species that will respond to a reduction in shrub competition.

Flail-type rotary machines (rotobearer), rotary mowers, circular saw-type equipment, or sickle mowers can be used. Equipment should be set to operate 4-inches ( $\pm$  2-inches) above the ground level. All equipment should meet OSHA standards for operator protection.

Operations are limited to stone-free areas on level to gently sloping landscapes.

Operations should be completed prior to seed maturation of target species in the season of control.

Number of operations will be sufficient to reduce target species composition capable of reproduction by 80 percent upon completion of treatment.

Re-vegetation should be planned if there is less than 25 percent composition (by-weight), in total, of desired understory species present in the plant community prior to treatment. See RANGE PLANTING (Code 550) or PASTURE AND HAY PLANTING (Code 512) conservation practice standards and specifications.

Treated area will be deferred to allow vegetative recovery for soil erosion protection. See PRESCRIBED GRAZING (Code 528) conservation practice standards and specifications.

**III. INSTALLATION** (continued)**MECHANICAL TREATMENT** (continued)**Brush Raking**

This method is effective on most shrub species including big sagebrush, rabbitbrush, and manzanita.

A bulldozer with a brush rake attachment is used.

Rakes vary from front-mounted to dump rakes that are towed.

Brush rakes shall penetrate deep enough to pull brush roots out of the ground.

Debris shall be pushed into windrows on the contour and allowed time to dry. Burn debris when dry and when weather conditions are favorable. Spread soil that has accumulated with windrowing following burning of dried brush.

Number of operations will be sufficient to reduce target species composition capable of reproduction by 80 percent upon completion of treatment.

Drill or broadcast with adapted species of grass and/or legumes and/or browse plants. See RANGE PLANTING (Code 550) conservation practice standards and specifications.

Treated areas will be deferred from grazing following treatment until seeded plants are well established and the soil is adequately protected with a vegetative cover to prevent erosion. See PRESCRIBED GRAZING (Code 528) conservation practice standards and specifications.

**Pushing**

This method is adapted to removal of juniper, singleleaf pinyon, and tree-type shrubs with large diameter main stems.

Bulldozer with blade, front-end brush-rake, or grubber is used.

Push over trees when the soils are moist (not wet).

Uprooted trees may be left in place, pushed into piles, or arranged in windrows.

Piles and windrows may be burned completely or selectively. Piles left intact provide wildlife cover.

Re-vegetation is recommended where 50 percent or more of the soil surface is disturbed or when there is less than 25 percent composition (by-weight), in total, of desired understory species present in the plant community prior to treatment. See RANGE PLANTING (Code 550) or PASTURE AND HAY PLANTING (Code 512) conservation practice standards and specifications.

Treated areas will be deferred from grazing following treatment until seeded plants are well established and/or the soil is adequately protected with a vegetative cover to prevent erosion. See PRESCRIBED GRAZING (Code 528) conservation practice standards and specifications.

**CHEMICAL TREATMENT**

Herbicidal treatments are appropriate for the management of woody species most commonly targeted for control in Nevada.

Chemical treatments provide a means of killing certain species (*i.e.*, crown-sprouters) that cannot be efficiently controlled by other methods.

Herbicides can be used in terrain or rocky areas unsuitable for mechanical equipment.

Chemicals may be applied by aerial spraying using helicopter or fixed-wing aircraft, by ground-rig application equipment, or by individual plant treatment methods. Aerial applications must be made low enough to obtain proper herbicide distribution. Aircraft application of liquid herbicide formulations is approved when wind speeds do not exceed 7-miles per hour. Dry, pelletized chemicals may be applied by aircraft at higher wind speeds. Ground-moving spray equipment can be used with wind velocities up to 10-miles per hour.

When water is used as a carrier, commercial wetting agents (surfactant/adjuvant) shall be used according to manufacturers' recommendation and herbicide label.

Herbicides used for brush management will never be applied over live water, including flowing springs. It is the responsibility of the landowner to ensure that herbicide applications are in full compliance with this requirement.

Application of granular herbicides from horseback is an efficient method to control young, re-invading woody species.

To meet most practice application objectives, herbicide treatment should be sufficient to reduce composition of target species capable of reproduction by 85 percent.

Land users and applicators using chemical herbicides are cautioned as follows:

*Read the entire container/product label –  
Follow all instructions and heed all  
precautions on the label.*

Landowners and applicators should be aware of and adhere to the provisions of local, county, state or federal laws and regulations concerning the use of agricultural chemicals.

Required conformance with permits of all local, state and federal regulations for use of chemicals shall be the responsibility of the landowner. Permits for use of chemicals will specify legally required setbacks from water courses, ponds, residences, etc.

### III. INSTALLATION (continued)

#### CHEMICAL TREATMENT (continued)

All recommendations for kinds, rates, and timing of application of herbicides used in management of brush will be in accordance with the latest:

- University of Nevada Cooperative Extension Service - Weed Control Recommendations;
- Pacific Northwest Weed Control Handbook; and/or,
- Montana-Utah-Wyoming Weed Management Handbook.

Copies of the above references are to be maintained in the NRCS Field Office technical library and listed in FOTG Section 1.1, "Reference List".

#### BIOLOGICAL TREATMENT

Management of brush by application of controlled grazing will be in accordance with conservation practice PRESCRIBED GRAZING (Code 528) standards and specifications.

#### PRESCRIBED BURNING

Management of brush by application of controlled burning will be in accordance with conservation practice PRESCRIBED BURNING (Code 338) specifications.

### IV. BASIS OF ACCEPTANCE

Upon completion of the work, the area will be inspected to determine the percent of control attained, and compliance with the above specifications.

Treated areas of rangeland will have form NV-ECS-01 (Rev. 4/88) "Rangeland Inventory Worksheet" completed (including estimates of canopy cover for woody species) as the *minimum* record of the effects of practice application. All form NV-ECS-01 entries required to be completed prior to practice application will be completed (see page 314-1, II. GENERAL SPECIFICATIONS, paragraph 4, of this document).

### V. OPERATION AND MAINTENANCE

Brush management treatment areas that are not seeded require a *minimum* period of deferment from use by domestic livestock. The period of deferment is dependent upon management objectives and the pretreatment density and vigor of desirable plants expected to benefit from application of the brush management practice.

Full benefit to established species released from competition with woody plants is usually realized after the second growing season following treatment (assuming "normal" growing conditions).

For areas treated in the early part of the growing season that have an adequate density of desirable understory species and recruitment of new seedlings is not an important objective, livestock use is to be deferred until the end of the growing season in the year the practice is installed. These conditions are applied to established seedlings of introduced forage plants that have had brush encroachment as well as for native rangeland plant communities on landscapes with 12-inches or more average annual precipitation.

For treatment areas that do not have an adequate density of desirable understory species and recruitment of new seedlings of desirable plants is an important objective following brush management, livestock use is to be deferred for two full growing seasons following treatment (assuming "normal" growing conditions).

Deferment periods may need to be extended if drought conditions prevail following brush management practice application.

Treated areas should be inspected periodically and determination made of "spots" where additional treatment is necessary.

### REFERENCES

Cain, Don. 1971. The Ely Chain. USDI-BLM, Ely, Nevada.

Jordan, G. L.. 1981. Range Seeding and Brush Management on Arizona Rangelands. Cooperative Extension Service, Agricultural Experiment Station Publication T81121, University of Arizona, Tucson, AZ.

Montana, Utah, and Wyoming Cooperative Extension Service. 1995. Weed Management Handbook. Montana State University, Bozeman, MT; Utah State University, Logan, UT; and University of Wyoming, Laramie, WY.

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Oregon, Idaho, and Washington Cooperative Extension Service. 1995. Pacific Northwest Weed Control Handbook. Oregon State University, Corvallis, OR. and Washington State University, Pullman, WA.